

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION

ORDER No. 96-121

SITE CLEANUP REQUIREMENTS FOR:

CHEVRON CHEMICAL COMPANY
PLANT SITE
RICHMOND MANUFACTURING FACILITY
CONTRA COSTA COUNTY

The California Regional Water Quality Control Board, San Francisco Bay Region (hereinafter the Board), finds that:

1. Site Description

Chevron Chemical Company owns and operates a facility (the Plant Site; formerly known as the Agricultural Chemicals Plant) at 940 Hensley Street in Richmond (EPA facility ID number CAD 043 237 486). The attached map shows the location of the Plant Site within the San Francisco Bay Region (Figure 1). The Plant Site contains an Acephate (a proprietary insecticide with trade name ORTHENE®) manufacturing facility and a fuel additives manufacturing, blending, and packaging facility (Polychem Plant). Also operated as part of the Plant Site are several hazardous waste storage or treatment units, which consist of three groups of tanks for storing liquid wastes, an incinerator for treatment by thermal oxidation of both organic and aqueous liquid wastes generated on-site and two drum storage areas.

Beginning in 1937, Chevron Chemical engaged in the manufacture and formulation of dry and liquid-based pesticides at this facility. While products and operations varied during the ensuing years, the major historical operations were segregated into three manufacturing areas: (1) the Orthene Plant, located in the northwest corner of the site; (2) the Pesticide Plant, located in the central portion of the site; and (3) the Polychem Plant, located in the southern portion of the site which was formerly used for the manufacture of a proprietary fungicide known as DIFOLATAN® (See Site Map - Figure 2).

2. Purpose

This Order requires cleanup of wastes discharged into waters of the state that create or threaten to create a condition of pollution or nuisance under the authority of Water Code Section 13304. This Order is also intended to provide RCRA equivalent corrective action in conformance with the provisions of the Plant Site RCRA Part B Permit.

3. Regulatory Status

In 1990, the Plant Site received a Part B Permit issued by US EPA pursuant to RCRA (Resource Conservation and Recovery Act), the federal hazardous waste program that has since been delegated to the California Department of Toxic Substances Control (DTSC). Chevron Chemical has implemented a substantial portion of the corrective action conditions included in its Part B permit. In 1996, the Board was designated as lead agency for overseeing completion of the corrective action program. The Plant Site also operates under Waste Discharge Requirements (WDR Order No. 81-65) and NPDES permit CA005134 (WDR Order No. 92-111).

4. Site Hydrogeology

Three water-bearing zones have been identified within 130 feet of ground surface. These zones are stratigraphically continuous over the site and are of higher permeability than the intervening strata. The water-bearing zones have been defined based on stratigraphy, differences in major element chemistry and differences in piezometric head. The water-bearing zones are called, in order of increasing depth, the A-zone, the C-zone and the B-zone.

Groundwater within the A-zone occurs in low-permeability fill and Bay Mud below a depth of about 5 feet and is considered non-potable because of its high salinity. The C-zone extends between depths of about 20 and 80 feet below grade and consists of an upper and lower alluvial sequence separated by near-shore estuarine deposits. In general, the upper 20 to 30 feet of alluvial soils consist of silty clay with occasional thin, localized sandy lenses. The C-zone is also considered non-potable because of its high salinity. Below the C-zone deposits, at a depth of 80 to 100 feet, a 20-foot-thick layer of estuarine clay is present. This clay unit acts as an aquitard between the C-zone and the deeper B-zone.

The B-zone is encountered at depths ranging from 100 to 130 feet beneath the site. This thin water-bearing zone contains a higher proportion of alluvial sands and gravels compared to surrounding soils. The B-zone is typically 5 to 15 feet thick and is overlain and underlain by alluvial and estuarine clays. The B-zone is considered the first fresh-water zone below the site. However, the B-zone groundwater quality degrades from east to west due to saltwater intrusion.

In general, groundwater gradients in the three water-bearing zones slope in a westerly direction toward San Pablo Bay. The permeability and transmissivity of all three zones are low, and none of the zones are capable of producing significant quantities of groundwater on a sustained yield basis. Based on slug and pump test data, Chevron Chemical has calculated the rate of groundwater flow to range from 4 to 40 feet per year horizontally and a fraction of a foot per year vertically upward. Groundwater levels measured in adjacent monitoring wells screened at different depths indicate an upward vertical gradient.

5. Groundwater Characteristics

a. Background Groundwater Quality: Analysis of groundwater samples for major cations and anions confirms that water quality varies laterally in all three water-bearing zones, degrading in a northwesterly direction due to saltwater intrusion. A comparison of the Plant Site groundwater quality monitoring data to state and federal drinking water standards known as Maximum Contaminant Levels (MCLs) is provided below. The shaded areas indicate which parameters exceed MCLs. In general, the quality of groundwater in the A- and C-zones is slightly brackish to saline and the quality of groundwater in the B-zone is moderately fresh to brackish.

Groundwater Quality within the Plant Site⁽¹⁾

Parameter	MCLs	A-zone	C-zone	B-zone
TDS ⁽²⁾	500 - recommended 1000 - upper	730 to 75,020	330 to 23,500	320 to 510
Specific Conductance	900 - recommended 1600 - upper	780 to 39,400	600 to 4,920	570 to 820
pH	6.5 to 8.5	4.9 to 9.4	6.6 to 7.6	7.1 to 8.2
Chloride	250	17 to 5,000	29 to 21,000	29 to 90
Sulfate	250	230 to 15,300	30 to 150	20 to 30
Manganese	0.05	ND to 2.4	ND to 5.7	ND to 0.3
Nitrate	45 as NO ₃ , 10 as N	6.4 to 4,500	ND to 3.2	ND to 2.1

⁽¹⁾ All units in mg/l except specific conductance (µmhos/cm), and pH (pH units). ND = not detected

⁽²⁾ State and Regional Water Board Resolutions No. 88-63 and No. 89-39, respectively, specify that all ground waters of the state are to be protected as potential sources of municipal or domestic supply, except under specific circumstances which include waters with TDS > 3000 mg/l.

b. Monitoring Program: As part of a 1986 Settlement Agreement with the California Department of Health Services (DOHS), Chevron Chemical was required to collect hydraulic data and conduct sampling and analysis of 29 monitoring wells with reporting requirements for a period of five consecutive years. Chevron Chemical has continued this monitoring program to the present.

c. Summary of Groundwater Contamination: Chemicals detected in groundwater include metals (primarily arsenic), volatile organic compounds (VOCs - primarily

toluene), chlorinated volatile organic compounds (CVOCs - primarily trichloroethene and tetrachloroethene) and pesticides.

The Chevron Chemical Plant Site groundwater monitoring network currently consists of 13 A-zone wells, 15 C-zone wells and three B-zone wells.

The analytical results of the groundwater monitoring program indicate the presence of localized pesticides, metals, CVOCs, and VOCs in the A-zone and CVOCs in the C-zone. The concentrations of these constituents in all but five of these wells are either stable or decreasing over time as shown by statistical trend analysis.

Arsenic has historically been detected in all of the downgradient A-zone monitoring wells. The highest concentration of arsenic above the laboratory practical quantitation limit (PQL) in 1995 was measured in well GW-13A at 1.87 mg/l. No pesticides or other metals were measured above the PQL in the A-zone in 1995. The highest concentration of toluene was 174.4 µg/l in GW-15A.

CVOCs have historically been measured in four C-zone wells. Four of these compounds detected in 1995 are shown below at their highest concentrations for that year.

Highest 1995 CVOC Concentrations in the C-zone

CVOC	Well No.	Concentration (µg/l)	Significance ⁽¹⁾
Tetrachloroethene (PCE)	GW-10C	4,081	N
Trichloroethene (TCE)	GW-15C	74,400	N
Vinyl Chloride	GW-11C	34.49	↑
Methylene Chloride	GW-11C	1,323	N

⁽¹⁾ ↑ = statistically increasing trend, ↓ = statistically decreasing trend; N = no statistically significant trend

In order to define the extent of compounds detected in GW-15C, four wells (GW-22C, GW-23C, GW-25C, and GW-26C - see Figure 2) were installed hydraulically downgradient west/southwest of GW-15C in 1985. None of the CVOCs were measured above the PQL in these downgradient wells in 1995. With the exception of TCE, detected at 11µg/l in one 1992 sampling event in GW-26C, none of the CVOCs have been measured at concentrations exceeding PQL's in ten years of sampling these wells. Monitoring well GW-11C, which has had levels of TCE in the 1-10 mg/l range for the last ten years, was installed northwest of GW-15C, but delineation of the lateral extent of migration of TCE in this direction still appears to be incomplete.

The 1995 analytical results for the B-zone wells included in the monitoring program are consistent with historical findings. The reported values for all metals, pesticides,

and indicator parameters were below the detection limits or within the normal background ranges. CVOC's and VOC's have never been detected in any B-zone wells in ten years of monitoring.

d. Evidence of Intrinsic Remediation of CVOCs: Chevron Chemical maintains that groundwater monitoring data collected since 1986 provide evidence that intrinsic remediation of PCE and TCE is occurring within the A- and C-zones beneath the Plant Site. Low dissolved oxygen measurements, coupled with oxidation reduction potentials indicative of reducing conditions, indicate anaerobic conditions in site groundwater. Reductive dechlorination of the more highly chlorinated hydrocarbons (i.e., PCE and TCE) occurs only under anaerobic conditions. The presence of intermediate and final breakdown products, such as 1,2-dichloroethene (1,2-DCE), vinyl chloride and ethene, demonstrates that reductive dechlorination of PCE and TCE is occurring. The effectiveness of reductive dechlorination for three A-zone and two C-zone wells is demonstrated in concentration versus time graphs which illustrate the reduction in parent compounds with correlative increases in breakdown products.

6. Remedial Investigations

a. Dense Non-Aqueous Phase Liquid (DNAPL) Investigation: In March 1992, a DNAPL investigation was performed using direct-push sampling techniques. Groundwater samples and stratigraphic information obtained during this DNAPL investigation indicates good correlation with groundwater results from existing wells and with samples obtained during previous soil boring programs. No DNAPLs were encountered in any of the groundwater samples taken for this investigation. One sample in the uppermost sandy layer of the C-zone indicated the presence of dissolved CVOCs. There were no CVOCs detected in the groundwater samples taken at the base of the contact of the deeper sandy units where DNAPLs would most likely be located if they had migrated to the base of the C-zone. This strongly indicates the absence of DNAPLs in the C-zone at the Plant Site.

b. Pumping Test: During the spring of 1991, a pumping test was conducted in groundwater monitoring well GW-10C located in the northwest corner of the site downgradient of the Acephate Plant. The results of the pump test indicated that A- and C-zones are hydraulically separate as demonstrated by no effect of pumping on nearby shallow zone wells and static vertical head differences indicating a small upward vertical gradient of about 1.5 to 3.5 feet.

c. Vacuum-Enhanced Groundwater Extraction Pilot Study: In December 1994, Chevron Chemical conducted a two-week pilot test of vacuum-enhanced groundwater extraction with a surface seal in the northwest corner of the Plant Site. The results indicated localized improvements in effectiveness over conventional pumping. However, implementation of such a system was evaluated to be impractical based on an evaluation of the number of extraction points required and the ability to place extraction points due to surface and subsurface obstructions and property ownership and right-of-way issues.

7. **Interim Remedial Measures**

a. Arsenicals (Pesticide) Plant Demolition and Cleanup: Pursuant to the 1986 Settlement Agreement with DOHS, Chevron Chemical was required to clean up the Arsenicals Plant in the central portion of the site. Tasks performed included demolition and removal of the Arsenicals Plant and accompanying equipment, excavation and removal of contaminated soil from the Arsenicals Plant site and installation of a pavement cap over the area to prevent stormwater infiltration.

b. Plant Modernization Program: To reduce to potential for future spills contributing to groundwater contamination, Chevron Chemical has performed the following modernization projects:

- (i) Placement of concrete and asphalt paving in selected areas;
- (ii) Double containment of process, hazardous material, and hazardous waste sumps and tanks;
- (iii) Replacement of old tank foundations in selected areas with grooved concrete to allow immediate leak detection;
- (iv) Placement of pipelines to and from process, hazardous material, and hazardous waste sumps and tanks in concrete-lined, below-grade trenches covered with steel plates to facilitate inspections; and,
- (v) Installation of spill containment systems for the railcar and tank truck unloading areas.

8. **Basis for Cleanup Standards**

a. General: State Board Resolution No. 68-16, "Statement of Policy with Respect to Maintaining High Quality of Waters in California," applies to this discharge and requires attainment of background levels of water quality, or the highest level of water quality which is reasonable if background levels of water quality cannot be restored. Cleanup levels other than background must be consistent with the maximum benefit to the people of the state, not unreasonably affect present and anticipated beneficial uses of such water, and not result in exceedance of applicable water quality objectives.

State Board Resolution No. 92-49, "Policies and Procedures for Investigation and Cleanup and Abatement of Discharges Under Water Code Section 13304," applies to this discharge. This order and its requirements are consistent with the provisions of Resolution No. 92-49, as amended.

b. Beneficial Uses: The Board adopted a revised Water Quality Control Plan for the San Francisco Bay Basin (Basin Plan) on June 21, 1995. This updated and consolidated plan represents the Board's master water quality control planning document. The revised Basin Plan was approved by the State Water Resources Control Board and the Office of Administrative Law on July 20, 1995, and November

13, 1995, respectively. A summary of regulatory provisions is contained in 23 CCR 3912. The Basin Plan defines beneficial uses and water quality objectives for waters of the State, including surface waters and groundwaters.

Board Resolution No. 89-39, "Sources of Drinking Water," defines potential sources of drinking water to include all groundwater in the region, with limited exceptions for areas of high TDS, low yield, or naturally-high contaminant levels.

The potential beneficial uses of groundwater underlying and adjacent to the site include:

- (i) Limited domestic water supply (B-zone only)
- (ii) Limited industrial process and service water supply (B-zone only)
- (iii) Limited agricultural water supply (B-zone only)
- (iv) Groundwater replenishment to surface waters (Castro Creek)

Ten years of groundwater monitoring indicate the A- and C-zone contaminants are not present in the B-zone. At present, there is no reported or expected beneficial use of groundwater underlying the site. The shallow groundwater (A- and C-zones) at the site does not qualify for municipal or domestic use due to the following reasons: 1) the maximum TDS of the groundwater (75,020 mg/l, A-zone; 23,500 mg/l, C-zone) is significantly higher than the maximum acceptable level of 3,000 mg/l for beneficial use in a public water supply system; and 2) the productivity of wells installed in the A-zone would produce a sustained yield of no more than 0.5 gpm.

Castro Creek, to the west, is the only surface water body within 2,000 feet of the Plant Site. Downstream of the Plant Site, Castro Creek joins Wildcat Creek, and the combined creeks flow into Castro Cove, an embayment of San Pablo Bay. The existing and potential combined beneficial uses of Castro Creek, Castro Cove, and San Pablo Bay include:

- (i) Industrial service supply
- (ii) Water contact recreation
- (iii) Non-contact water recreation
- (iv) Wildlife habitat
- (v) Ocean commercial and sport fishing
- (vi) Fish migration and spawning
- (vii) Navigation
- (viii) Estuarine habitat
- (ix) Shellfish harvesting
- (x) Preservation of rare and endangered species

9. **Authority and Basis for Order**

The discharger has caused or permitted waste to be discharged or deposited where it is or probably will be discharged into waters of the State and creates or threatens to create a condition of pollution or nuisance. This Order has, therefore, been prepared for Board adoption pursuant to Section 13304 of the California Water Code. In addition, as discussed in Finding 3 above, the Board has been designated as the lead agency for purposes of the RCRA corrective action program at the Plant Site pursuant to SB1082. This Order is intended to fulfill the remaining requirements set forth in Section V of Chevron Chemical's RCRA Part B Permit effective September 27, 1990.

10. **Cost Recovery**

Pursuant to California Water Code Section 13304, the discharger is hereby notified that the Board is entitled to, and may seek reimbursement for, all reasonable costs actually incurred by the Board to investigate unauthorized discharges of waste and to oversee cleanup of such waste, abatement of the effects thereof, or other remedial action, required by this order.

11. **CEQA**

This action is an order to enforce the laws and regulations administered by the Board. As such, this action is categorically exempt from the provisions of the California Environmental Quality Act (CEQA) pursuant to Section 15321 of the Resources Agency Guidelines.

12. **Notification**

The Board has notified the discharger and all interested agencies and persons of its intent under California Water Code Section 13304 to prescribe site cleanup requirements for the discharge, and has provided them with an opportunity to submit their written comments.

13. **Public Hearing**

The Board, at a public meeting, heard and considered all comments pertaining to this discharge.

IT IS HEREBY ORDERED, pursuant to Section 13304 of the California Water Code, that the discharger (or its agents, successors, or assigns) shall cleanup and abate the effects described in the above findings as follows:

A. Prohibitions

1. The discharge of wastes or hazardous substances in a manner which will degrade water quality or adversely affect beneficial uses of waters of the State is prohibited.
2. Further significant migration of wastes or hazardous substances through subsurface transport to waters of the State is prohibited.
3. Activities associated with the subsurface investigation and cleanup which will cause significant adverse migration of wastes or hazardous substances are prohibited.

B. Tasks

1. Risk Assessment

COMPLIANCE DATE: *March 15, 1997*

Chevron Chemical shall submit a report, acceptable to the Executive Officer, which provides estimates for existing and potential impacts to human health and the environment from exposure to chemicals detected in groundwater or migrating from subsurface soil to groundwater. The procedures to be used will be consistent with those described in USEPA and Cal/EPA guidance documents. At a minimum, this risk assessment will:

- a. Identify exposure pathways and receptors;
- b. Screen for chemicals of potential interest;
- c. Verify chemical fate and transport information;
- d. Estimate exposure point concentrations;
- e. Estimate the upper bound on possible risks to human receptors; and,
- f. Characterize the potential for toxicity to ecological receptors.

2. Establishment of Water Quality Protection Standards (WQPS)

COMPLIANCE DATE: *August 1, 1997*

Based on the results of the risk assessment, groundwater monitoring data and the results of the 1996 Intrinsic Remediation Monitoring Program, Chevron Chemical will submit a report, acceptable to the Executive Officer, establishing WQPS for the Plant Site which, at a minimum, will include:

- a. A list of site-specific Constituents of Concern (COC's) and monitoring parameters based on the results of the risk assessment performed in Task 1;
- b. Points of compliance and Maximum Allowable Concentration Limits (MACL's) for all COC's at these points. MACL's must be protective of all human and ecological receptors at and downgradient of the points of compliance;
- c. Tools to measure the success of intrinsic remediation, including:
 - (i) Expected trends in concentration over time for the COC parent compounds and degradation products of intrinsic remediation;
 - (ii) Plots of concentration over time for individual compounds demonstrating decreasing trends which eventually reach asymptotic levels.

3. Hydrogeologic Investigation of the Extent of CVOC Contamination in the C-zone Near the Polychem Plant

Elevated levels of TCE in monitoring well GW-15C (31 - 74 mg/l in 1995) immediately west of the Polychem Plant have consistently been reported over the past ten years. Although four wells were drilled west/southwest of GW-15C to investigate off-site migration of TCE, characterization of the extent of migration immediately northwest of GW-15C is incomplete. Chevron Chemical will submit:

- a. A workplan and schedule, acceptable to the Executive Officer, to identify source areas up- or co-gradient of GW-15C and the lateral and vertical extent of TCE (and any other CVOCs present) downgradient of GW-15C.

COMPLIANCE DATE: *October 1, 1996*

- b. A technical report, acceptable to the Executive Officer, which defines the lateral and vertical extent of TCE and other CVOCs in groundwater in the vicinity of GW-15C.

COMPLIANCE DATE: *March 15, 1997*

- c. If determined necessary by Board staff based on the results obtained from 3.a. and 3.b. above and Intrinsic Remediation data, a workplan and schedule, acceptable to the Executive Officer, for corrective action of TCE or any other CVOCs present in groundwater in the vicinity of GW-15C and anywhere else concentrations are found to exceed 10 mg/l.

COMPLIANCE DATE: *July 1, 1997*

4. Enhanced In-Situ Remediation of PCE/TCE Investigation

Chevron Chemical maintains it has demonstrated the occurrence of intrinsic remediation of CVOCs in the A- and C-zones at the site based on historical monitoring data. However, increasing concentrations of PCE and TCE observed in GW-40C in the northwestern corner of the site over time suggest that intrinsic remediation is not occurring site-wide at the same rate. Chevron Chemical will perform an investigation consisting of the following four tasks to evaluate the potential to enhance in-situ remediation of PCE/TCE in this area as described in the "Proposal for Remediation/Corrective Action" dated January, 1996.

a. Hydrogeologic Delineation: This task includes further hydrogeologic investigation in the northwestern corner of the site, in the vicinity of wells GW-10C and GW-40C to identify factors influencing PCE/TCE transport in this area and delineate the lateral and vertical extent of off-site contamination. Following the field investigation which will use direct push technology for logging subsurface materials, grab sampling, and installing temporary well points, Chevron Chemical will submit a report, acceptable to the Executive Officer, containing the following:

- (i) Hydrogeologic cross sections, including additional lithologic logs;
- (ii) Physical and chemical analytical results for soil and groundwater grab samples;
- (iii) Estimated groundwater gradients;
- (iv) Estimated hydraulic and transport properties; and,
- (v) Estimated rates of groundwater flow and solute transport.

COMPLIANCE DATE: *February 15, 1997*

b. Geochemical Evaluation: This task includes sampling and analysis of groundwater to evaluate geochemical conditions controlling reductive dechlorination of PCE and TCE. Results of this evaluation will be submitted in the following three reports:

- (i) Summary progress report following the first two quarterly sampling events;

COMPLIANCE DATE: *October 1, 1996*

- (ii) Summary progress evaluation report following four quarterly sampling events identifying potential factors controlling intrinsic remediation near GW-40C;

COMPLIANCE DATE: *May 1, 1997*

- (iii) Detailed evaluation and recommendations report, acceptable to the Executive Officer, after eight quarterly sampling events which will identify remedial measures, discuss whether the monitoring program should be modified, and make recommendations regarding Tasks 4.c. and d.

COMPLIANCE DATE: *June 1, 1998*

c. Biotransformation Potential Assessment: The need to perform this task is contingent upon the results of the Geochemical Evaluation (Task 4.b.) and the Risk Assessment (Task 1). This assessment, if required, will include microcosm testing to evaluate whether available microbial populations may be limiting. Microcosm biotransformation data will be presented and interpreted to determine what, if any, test conditions enhance biotransformation of CVOCs in the subsurface material. Recommendations regarding if and how to proceed with Task 4.d. will be included.

COMPLIANCE DATE: *April 1, 1999 if required by the Executive Officer*

d. Options Evaluation: This will only be required if, in the opinion of the Executive Officer, the results of Tasks 4.a., b., and c. indicate the potential to enhance biotransformation of PCE and TCE. This would entail an evaluation of options to enhance in-situ remediation, e.g., augmentation of substrate, electron acceptors, and/or microbial populations.

COMPLIANCE DATE: *As required by the Executive Officer, not to exceed two years after the date of approval of Task 4.c.*

5. **Three-Year Status Report**

COMPLIANCE DATE: *December 1, 1999*

Chevron Chemical will submit a technical report acceptable to the Executive Officer evaluating the effectiveness of intrinsic remediation. The report should include:

- a. Summary of effectiveness in controlling contaminant migration and protecting human health and the environment;
- b. Comparison of contaminant concentration trends with the expected trends established as part of the WQPS;
- c. Comparison of anticipated versus actual costs of remedial activities;
- d. Performance data (e.g. chemical mass removed);

- e. Cost effectiveness data (e.g. cost per pound of contaminant removed);
 - f. Summary of additional investigations (including results) and significant modifications to remediation systems;
 - g. Additional remedial actions proposed to meet WQPS including time schedule if remediation efforts do not indicate substantial progress; and,
 - h. A long-term monitoring and corrective action program.
6. **Delayed Compliance:** If Chevron Chemical is delayed, interrupted, or prevented from meeting one or more of the completion dates specified for the above tasks, it shall promptly notify the Executive Officer **at least 60 days in advance of the compliance date**. Any extensions of the time deadlines set forth above must be confirmed in writing by the Executive Officer.

C. PROVISIONS

1. **No Nuisance:** The storage, handling, treatment, or disposal of polluted soil or groundwater shall not create a nuisance as defined in California Water Code Section 13050(m).
2. **Good Operation and Maintenance (O&M):** The discharger shall maintain in good working order and operate as efficiently as possible any facility or control system installed to achieve compliance with the requirements of this Order.
3. **Cost Recovery:** The discharger shall be liable, pursuant to California Water Code Section 13304, to the Board for all reasonable costs actually incurred by the Board to investigate unauthorized discharges of waste and to oversee cleanup of such waste, abatement of the effects thereof, or other remedial action, required by this Order. If the site addressed by this Order is enrolled in a State Board-managed reimbursement program, reimbursement shall be made pursuant to this Order and according to the procedures established in that program. Any disputes raised by the discharger over reimbursement amounts or methods used in that program shall be consistent with the dispute resolution procedures for that program.
4. **Access to Site and Records:** In accordance with California Water Code Section 13267(c), the discharger shall permit the Board or its authorized representative:
 - a. Entry upon premises in which any pollution source exists, or may potentially exist, or in which any required records are kept, which are relevant to this Order.
 - b. Access to copy any records required to be kept under the requirements of this Order.
 - c. Inspection of any monitoring or remediation facilities installed in response to this Order.

- d. Sampling of any groundwater or soil which is accessible, or may become accessible, as part of any investigation or remedial action program undertaken by the discharger.
5. **Self-Monitoring Program:** Chevron Chemical shall comply with the Self-Monitoring Program as attached to this Order and as may be amended by the Executive Officer. The Self-Monitoring Program supercedes the original monitoring program specified by the DOHS.
6. **Requests to Revise the Self-Monitoring Program:** At any time, Chevron Chemical may file a written request (including appropriate supporting documentation) with the Executive Officer, proposing modifications to the attached Self-Monitoring Program. If the proposed modifications are acceptable, a letter of approval signed by the Executive Officer will be issued which will incorporate these revisions into the Self-Monitoring Program.
7. **Report Certifications:** All technical documents shall be signed by and stamped with the seal of a California registered geologist, a California certified engineering geologist, or a California registered civil engineer.
8. **Lab Qualifications:** All samples shall be analyzed by State-certified laboratories or laboratories accepted by the Board using approved EPA methods for the type of analysis to be performed. All laboratories shall maintain quality assurance/quality control (QA/QC) records for Board review. This provision does not apply to analyses that can only reasonably be performed on-site (e.g. temperature).
9. **Document Distribution:** Copies of all correspondence, technical reports, and other documents pertaining to compliance with this Order shall be provided to the following agencies:
- a. RWQCB - San Francisco Bay Region
 - b. Cal/EPA Department of Toxic Substances Control
- The Executive Officer may modify this distribution list as needed.
10. **Reporting of Changed Owner or Operator:** The discharger shall file a technical report on any changes in site occupancy or ownership associated with the property described in this Order.
11. **Reporting of Hazardous Substance Release:** If any hazardous substance is discharged in or on any waters of the State, or discharged or deposited where it is, or probably will be, discharged in or on any waters of the State, the discharger shall report such discharge to the Regional Board by calling (510) 286-1255 during regular office hours (Monday through Friday, 8:00 to 5:00).

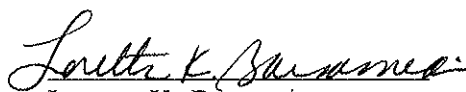
A written report shall be filed with the Board within five working days. The report shall describe: the nature of the hazardous substance, estimated quantity involved, duration of incident, cause of release, estimated size of affected area,

nature of effect, corrective actions taken or planned, schedule of corrective actions planned, and persons/agencies notified.

This reporting is in addition to reporting to the Office of Emergency Services required pursuant to the Health and Safety Code.

12. **Periodic SCR Review:** The Board will review this Order periodically and may revise it when necessary. Chevron Chemical may request revisions and upon review the Executive Officer may recommend that the Board revise these requirements.

I, Loretta K. Barsamian, Executive Officer, do hereby certify that the foregoing is a full, true, and correct copy of an Order adopted by the California Regional Water Quality Control Board, San Francisco Bay Region, on September 18, 1996.

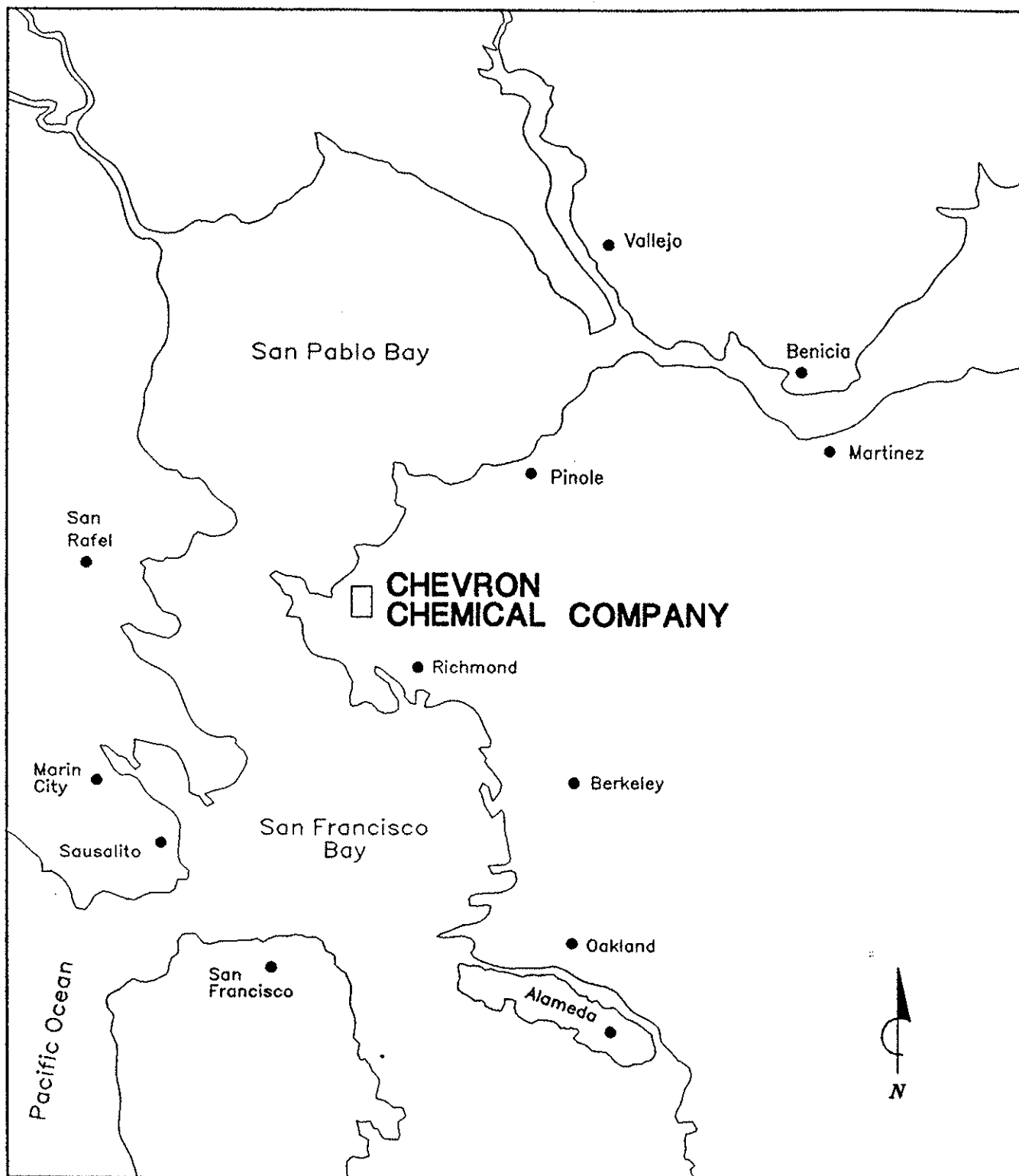

Loretta K. Barsamian
Executive Officer

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FAILURE TO COMPLY WITH THE REQUIREMENTS OF THIS ORDER MAY SUBJECT YOU TO ENFORCEMENT ACTION, INCLUDING BUT NOT LIMITED TO: IMPOSITION OF ADMINISTRATIVE CIVIL LIABILITY UNDER WATER CODE SECTIONS 13268 OR 13350, OR REFERRAL TO THE ATTORNEY GENERAL FOR INJUNCTIVE RELIEF OR CIVIL OR CRIMINAL LIABILITY

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Attachments: Figure 1 - Area Map
Figure 2 - Site Map
A. Self-Monitoring Program



**LOCATION MAP
CHEVRON CHEMICAL COMPANY
RICHMOND, CA**

FIGURE 1

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION

SELF-MONITORING PROGRAM FOR:

CHEVRON CHEMICAL COMPANY
PLANT SITE
RICHMOND MANUFACTURING FACILITY
CONTRA COSTA COUNTY

1. **Authority and Purpose:**

The Board requests the technical reports required in this Self-Monitoring Program pursuant to Water Code Sections 13267 and 13304. This Self-Monitoring Program is intended to document compliance with Board Order No. 96-121 (water quality standards).

2. **Monitoring:**

Chevron Chemical shall measure groundwater elevations quarterly in all monitoring wells, and shall collect and analyze representative samples of groundwater according to the schedule shown in Tables 1 and 2.

Chevron Chemical shall sample any new monitoring or extraction wells quarterly and analyze groundwater samples for the same constituents as shown in Tables 1 and 2. Chevron Chemical may propose changes to these tables; any proposed changes are subject to Executive Officer approval.

3. **Semi-Annual Monitoring Reports:**

A written **Semi-Annual Monitoring Report** shall be submitted once annually on October 1st (reporting period starts on January 1st each year and continues to June 30). The second Semi-Annual Report, due May 1st, will be an **Annual Summary Report** (reporting Period starts on July 1st each year and continues to December 31). The Annual Report for 1997 will be combined with the Recommendations Report which is part of the Enhanced In-Situ Remediation of PCE/TCE Investigation [Task 3b (iii)] of Board Order No. 96-121, and will be due June 1, 1998. The reports shall include:

a. **Transmittal Letter:** The transmittal letter shall discuss any violations during the reporting period and actions taken or planned to correct the problem. The letter shall be signed by the discharger's principal executive officer or his/her duly authorized representative, and shall include a statement by the official, under penalty of perjury, that the report is true and correct to the best of the official's knowledge.

ATTACHMENT A, Board Order No. 96-121

b. **Groundwater Elevations:** Groundwater elevation data shall be presented in tabular form, and a groundwater elevation map should be prepared for each monitored water-bearing zone. Historical groundwater elevations shall be included in the annual reports.

c. **Groundwater Analyses:** Semi-Annual reports shall include analytical data for the first and second quarters. Groundwater analytical results for the entire year shall be included in the annual report. Groundwater sampling data shall be presented in tabular form. The report shall indicate the analytical method used, detection limits obtained for each reported constituent and a summary of QA/QC data. Supporting data, such as lab data sheets, need not be included (see record keeping below).

d. **Demonstration of Intrinsic Remediation:** The annual reports shall provide a demonstration of the on-going intrinsic remediation. These reports shall include plots showing trends in concentration over time for the COC parent compounds and degradation products of intrinsic remediation.

e. **Status Report:** The annual reports shall describe relevant work completed during the reporting period (e.g. site investigation, interim remedial measures) and work planned for the following year.

4. **Violation Reports:**

If the discharger violates requirements in the Site Cleanup Requirements, then the discharger shall notify the Board office by telephone as soon as practicable once the discharger has knowledge of the violation. Board staff may, depending on violation severity, require the discharger to submit a separate technical report on the violation within five working days of telephone notification.

5. **Other Reports:**

Chevron Chemical shall notify the Board in writing prior to any site activities, such as construction or underground tank removal, which have the potential to cause further migration of contaminants or which would provide new opportunities for site investigation.

6. **Record Keeping:**

Chevron Chemical or his/her agent shall retain data generated for the above reports, including lab results and QA/QC data, for a minimum of six years after origination and shall make them available to the Board upon request.

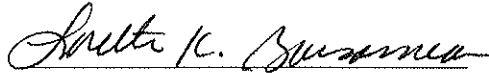
7. **SMP Revisions:**

Revisions to the Self-Monitoring Program may be ordered by the Executive Officer, either on his/her own initiative or at the request of the discharger. Prior to making SMP revisions, the Executive Officer will consider the burden, including costs, of

ATTACHMENT A, Board Order No. 96-121

associated self-monitoring reports relative to the benefits to be obtained from these reports.

I, Loretta K. Barsamian, Executive Officer, hereby certify that this Self-Monitoring Program was adopted by the Board on September 18, 1996.

A handwritten signature in cursive script, reading "Loretta K. Barsamian", written in dark ink.

Loretta K. Barsamian

Executive Officer

Attachments: Tables 1 and 2

Table 1
Existing/Proposed Groundwater Monitoring Program for Plant Site Wells

Zone	Well	Location	Existing Sampling Frequency	Proposed Sampling Frequency	Parameters Analyzed														
					pH	Spec. Cond.	Temp	TOC	TDS	Chloride	Arsenic	VOCs	Chlordane	Lindane	Orthene	Monitor	Paraquat	2,4-D	2,4,5-TP
A	GW-7A	Upgradient	Semi-Annually	Semi-Annually	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	GW-8A	Upgradient	Semi-Annually	Semi-Annually	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	GW-10A	Plant Site	Semi-Annually	Quarterly	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	GW-11A	Downgradient	Semi-Annually	Quarterly	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	GW-12A	Plant Site	Semi-Annually	Quarterly	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	GW-13A	Plant Site	Semi-Annually	Quarterly	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	GW-14A	Plant Site	Every 5 years	Every 5 years	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	GW-15A	Plant Site	Semi-Annually	Quarterly	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	GW-19A	Plant Site	Semi-Annually	Semi-Annually	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	GW-20A	Plant Site	Semi-Annually	Semi-Annually	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
B-4	Plant Site	Every 5 years	Every 5 years	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
B-5	Plant Site	Every 5 years	Every 5 years	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
C	GW-7C	Upgradient	Annually	Semi-Annually	X	X	X	X	X	X	X	X	X						
	GW-8C	Upgradient	Annually	Semi-Annually	X	X	X	X	X	X	X	X	X						
	GW-8B	Upgradient	Every 5 years	Every 5 years	X	X	X	X	X	X	X	X	X						
	GW-10C	Plant Site	Semi-Annually	Quarterly	X	X	X	X	X	X	X	X	X						
	GW-11C	Plant Site	Quarterly	Quarterly	X	X	X	X	X	X	X	X	X						
	GW-14C	Plant Site	Every 5 years	Every 5 years	X	X	X	X	X	X	X	X	X						
	GW-15C	Plant Site	Semi-Annually	Quarterly	X	X	X	X	X	X	X	X	X						
	GW-19C	Plant Site	Annually	Quarterly	X	X	X	X	X	X	X	X	X						
	GW-21C	Plant Site	Annually	Quarterly	X	X	X	X	X	X	X	X	X						
	GW-6C-1	Downgradient	Annually	Quarterly	X	X	X	X	X	X	X	X	X						
	GW-22C	Downgradient	Semi-Annually	Semi-Annually	X	X	X	X	X	X	X	X	X						
	GW-23C	Downgradient	Semi-Annually	Semi-Annually	X	X	X	X	X	X	X	X	X						
	GW-25C	Downgradient	Semi-Annually	Semi-Annually	X	X	X	X	X	X	X	X	X						
	GW-26C	Downgradient	Semi-Annually	Semi-Annually	X	X	X	X	X	X	X	X	X						
GW-40C	Downgradient	Quarterly	Quarterly	X	X	X	X	X	X	X	X	X							
B	GW-6B-2	Plant Site	Annually	Annually	X	X	X	X	X	X	X	X	X						
	GW-7B	Upgradient	Annually	Annually	X	X	X	X	X	X	X	X	X						
	GW-10B	Plant Site	Annually	Annually	X	X	X	X	X	X	X	X	X						

Notes:

VOC's are analyzed by Methods 8010/8020.

Monitoring as detailed above will continue from 1996-1999. By December 1, 1999, Chevron Chemical will submit a Three-year Status Report which will include a proposed long-term monitoring plan.

Table 2
Summary of Intrinsic Remediation Monitoring Parameters, Analytical Methods, and Sampling Requirements
(A and C Zone Wells)

Parameter	Field/Laboratory	Analytical Method
Environmental Parameters		
pH	Field measurement	EPA Method 150.1, direct-reading meter
Specific Conductance	Field measurement	EPA Method 120.1, direct-reading meter
Temperature	Field measurement	EPA Method 170.1
Alkalinity	Field measurement	HACH Test Method 8221 (Model AL AP MG-L)
	Laboratory	EPA Method 310.2
Ion Balance (Ca, Mg, Na, K)	Laboratory	EPA Method Series 6000 (ICP)
Substrates and Nutrients		
Total Organic Carbon (TOC)	Laboratory	EPA Method 415.1
Ammonia	Laboratory	EPA Method 350.2
Ortho-phosphate	Laboratory	EPA Method 365.2
Chemical Oxygen Demand	Laboratory	EPA Method 410.4
Biochemical Oxygen Demand	Laboratory	EPA Method 405.1
Parent Contaminants and Breakdown Products		
Chloroethane	Laboratory	EPA Method 8010
Ethene/Ethane	Laboratory	AUS GC-0019
Chloride	Laboratory	EPA Method 325.3
Electron Acceptors and Redox Indicators		
Dissolved Oxygen	Field measurement	EPA Method 360.1, dissolved oxygen meter and flow cell or down-hole probe
Oxidation-Reduction Potential (Redox)	Field measurement	APHA 2580
Nitrate/Nitrite	Laboratory	EPA Method 353.2
Sulfate	Laboratory	EPA Method 375.4
Sulfide	Laboratory	EPA Method 376.2
Total Iron	Laboratory	EPA Method 6010
Dissolved Iron	Laboratory	EPA Method 6010
Total Manganese	Laboratory	EPA Method 6010
Dissolved Manganese	Laboratory	EPA Method 6010
Methane	Laboratory	AUS GC-0019
NOTES: ¹ "APHA" refers to "Standard Methods for the Examination of Water and Wastewater", 18th edition, 1992. ² "EPA" refers to the "Test Methods for Evaluation Solid Waste, Physical, and Chemical Methods", SW-846, USEPA, 3rd edition, 1986 or EPA-600 Water and Wastewater methods.		